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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/561,926

12/22/2005

Akira Kurozuka

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03/21/2011

WENDEROTH, LIND & PONACK L.L.P.

1030 15th Street, N.W.

Suite 400 East

Washington, DC 20005-1503

EXAMINER

BIBBINS, LATANYA

ART UNIT

PAPER NUMBER

2627

NOTIFICATION DATE

DELIVERY MODE

03/21/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ddalecki@wenderoth.com

coa@wenderoth.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/561,926	<b>Applicant(s)</b> KUROZUKA ET AL.	
	<b>Examiner</b> LATANYA BIBBINS	<b>Art Unit</b> 2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 January 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 29-32 and 38-56 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 29-32, 38-42, 45 and 52-55 is/are rejected.
- 7) ☒ Claim(s) 43, 44, 46-51 and 56 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

**1.** In the remarks filed on January 3, 2011, Applicant amended claims 29, 52 and 54 and submitted arguments for allowability of pending claims 29-32 and 38-56.

### ***Response to Arguments***

**2.** Applicant's arguments filed January 3, 2011 have been fully considered but they are not persuasive.

Applicant argues that contrary to the instant claims, which require switching between magnetization and demagnetization in order to change the shape of the variable mirror by a magnetic force, Maruyama discloses changing the shape of the variable mirror using an electromagnetic force. Applicant further argues that Maruyama teaches that the shape of the variable mirror is changed by utilizing an "electromagnetic force" versus a "magnetic force" as required by the instant claims.

Examiner maintains that by definition, a permanent magnet retains magnetism after being magnetized by electrical current. Maruyama discloses a deformable mirror able to change to flat, convex and concave surfaces (see the discussion in paragraph [0017]). In paragraphs [0036], [0037] and [0039] Maruyama further discloses applying "switchable current" and "current of different quantities" to the coils in order to deform the mirror to the desired shape. Maruyama also teaches that the direction of the current can be changed to achieve the desired surface. Since the permanent magnet retains magnetism after being magnetized by electrical current, in order for the mirror to change

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to either flat, convex, or concave after application of an electrical current, the permanent magnet must be demagnetized.

Examiner agrees with applicant's argument that Maruyama discloses that the shape of the variable mirror is changed by an electromagnetic force. However, while the instant claims recite that the reflection mirror is switched between the deformed state and the non-deformed state using a magnetic force, the specification describes a reflection mirror which is switched between a deformed state and a non-deformed state in a similar fashion as Maruyama; "when current is passed through the switching device by means of a driving circuit, a magnetic attraction force  $F$  is induced and the reflection mirror is deformed in such a manner that the reflection surface forma a concave surface" (pages 18 and 19 of applicants specification) and "The magnetizing member includes a yoke affixed to the hard magnetic member and a magnetizing coil wound around the hard magnetic member. When a current is passed through the magnetizing coil a predetermined magnetomotive force is induced so that the hard magnetic member is magnetized or demagnetized" (page 25 of applicants specification). As best understood by Examiner, since a current carrying coil is wound around the hard magnetic member, applicant's specification describes a reflection mirror which is deformed using electromagnetic force.

While limitations from the specification are not read into the claims, the claims are read in light of the specification. Given the close relationship between electromagnetic force and magnetic force one of ordinary skill in the art would have

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recognized that the use of electromagnetic force includes a portion of magnetic force and therefore Maruyama provides support for the claimed limitation.

***Claim Rejections - 35 USC § 102***

**3.** The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**4.** **Claims 29-32, 39, 40, 45 and 52-55 are rejected under 35 U.S.C. 102(b) as being anticipated by Maruyama (JP 2003-067969).**

**Regarding claim 29,** Maruyama discloses a deformable mirror (element 409 of drawings 16 and 18) comprising: a reflection mirror having a reflection surface on which light is reflected (409a of drawings 16 and 18 and the discussion in paragraphs [0036]-[0039]), at least part of the reflection mirror being made of a ferromagnetic member (409e of drawings 16 and 18 and the discussion in paragraphs [0036]- [0039]), the reflection mirror having a deformed state and a non-deformed state (see the discussion in paragraphs [0017] and [0036]-[0039] where current of different values are applied to the coils to achieve different deformations of the mirror); and a switching device that switches the reflection mirror between the deformed state and the non-deformed state using a magnetic force (elements 426 and 427 of drawings 16 and 18 and the discussion in paragraphs [0036]-[0039]), the switching device having a hard magnetic member made of a hard magnetic material and a magnetizing unit (elements 426 and

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427 of drawings 16 and 18 and the discussion in paragraphs [0036]- [0039]), wherein a current is passed through the switching device by a driving circuit (see element 428 and 413 of Figures 16 and 18 respectively and the discussion in paragraphs [0036] and [0039]), wherein the hard magnetic member has a state in which the hard magnetic member is magnetized and a state in which the hard magnetic member is demagnetized, and the magnetizing unit is switchable between the state in which the hard magnetic member is magnetized and the state in which the hard magnetic member is demagnetized (see the discussion in paragraphs [0036]-[0039] where current of different values are applied to the coils to achieve different deformations of the mirror; also note the discussion regarding permanent magnet 426), wherein the current, applied by the driving circuit, is passed through the magnetizing coil of the switching device only when the reflection mirror is switched between the deformed state and the non-deformed state (see the discussion in paragraphs [0036]-[0039] where current of different values are applied to the coils to achieve different deformations of the mirror; also note the discussion regarding permanent magnet 426).

**Regarding claim 30,** Maruyama discloses the deformable mirror according to claim 29, wherein: the reflection mirror is switched into the deformed state by attracting the ferromagnetic member in the reflection mirror when the hard magnetic member is magnetized by the magnetizing unit, and the reflection mirror is switched into-the non-deformed state when the hard magnetic member is demagnetized by the magnetizing unit (see the discussion in paragraphs [0017] and [0036]- [0039]).

**Regarding claim 31**, Maruyama discloses the deformable mirror according to claim 29, wherein: the magnetizing unit includes a yoke, a magnetizing coil, and a sub-coil (see elements 423 and 427 of drawings 16 and 18 and drawings 19-21).

**Regarding claim 32**, Maruyama discloses the deformable mirror according to claim 31, wherein: the reflection mirror includes a back surface (see drawings 16-21) and a side portion and at least part of the sub-coil and the yoke are disposed on the back surface and the side portion of the reflection mirror (see drawings 16-21).

**Regarding claim 39**, Maruyama discloses the deformable mirror according to claim 29, wherein: the reflection mirror includes a base member comprising a ferromagnetic plate material (409e of drawings 16 and 18 and the discussion in paragraph [0039]).

**Regarding claim 40**, Maruyama discloses the deformable mirror according to claim 31, wherein: the ferromagnetic member and the yoke form part of a magnetic circuit (see drawings 16-21).

**Regarding claim 45**, Maruyama discloses the deformable mirror according to claim 29, wherein: the ferromagnetic member is made of a hard magnetic material (see the discussion in paragraph [0039]).

**Regarding claim 52**, Maruyama discloses an optical head configured to concentrate light on an optical information recording medium (drawings 6 and 7), the optical head comprising: an objective lens that concentrates light on the optical information recording medium (element 7 of drawings 6 and 7); an objective lens actuator that drives the objective lens (see the discussion in paragraphs [0002]-[0006]);

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and the deformable mirror disposed to reflect light emitted from a light source toward the objective lens (element 6 of drawings 6 and 7), a deformable mirror including: a reflection mirror having a reflection surface on which light is reflected (409a of drawings 16 and 18 and the discussion in paragraphs [0036]-[0039]), at least part of the reflection mirror being made of a ferromagnetic member (409e of drawings 16 and 18 and the discussion in paragraphs [0036]- [0039]), the reflection mirror having a deformed state and a non-deformed state (see the discussion in paragraphs [0017] and [0036]-[0039] where current of different values are applied to the coils to achieve different deformations of the mirror); and a switching device that switches the reflection mirror between the deformed state and the non-deformed state using a magnetic force (elements 426 and 427 of drawings 16 and 18 and the discussion in paragraphs [0036]-[0039]), the switching device having a hard magnetic member made of a hard magnetic material and a magnetizing unit (elements 426 and 427 of drawings 16 and 18 and the discussion in paragraphs [0036]- [0039]), wherein a current is passed through the switching device by a driving circuit (see element 428 and 413 of Figures 16 and 18 respectively and the discussion in paragraphs [0036] and [0039]), wherein the hard magnetic member has a state in which the hard magnetic member is magnetized and a state in which the hard magnetic member is demagnetized, and the magnetizing unit is switchable between the state in which the hard magnetic member is magnetized and the state in which the hard magnetic member is demagnetized (see the discussion in paragraphs [0036]-[0039] where current of different values are applied to the coils to achieve different deformations of the mirror; also note the discussion regarding



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permanent magnet 426), wherein the current, applied by the driving circuit, is passed through the magnetizing coil of the switching device only when the reflection mirror is switched between the deformed state and the non-deformed state (see the discussion in paragraphs [0036]-[0039] where current of different values are applied to the coils to achieve different deformations of the mirror; also note the discussion regarding permanent magnet 426).

**Regarding claim 53,** Maruyama discloses the optical head according to claim 52, wherein: the deformable mirror is provided in a space below the objective lens actuator (see drawings 6-8).

**Regarding claim 54,** Maruyama discloses an optical recording and playback device that concentrates light on an optical recording and playback medium having two recording layers and performs at least one of recording information in and reading recorded information from the optical recording and playback medium, the optical recording and playback device comprising: an optical head (drawings 6 and 7); and a feeding portion that supplies the optical head with power (element 412 of drawing 18), the optical head configured to concentrate light on an optical recording and playback medium (see drawings 6 and 7 and the discussion in paragraphs [0002]-[0006]), the optical head including: an objective lens that concentrates light on the optical information recording medium (element 7 of drawings 6 and 7); an objective lens actuator that drives the objective lens (see the discussion in paragraphs [0002]-[0006]); and the deformable mirror disposed to reflect light emitted from a light source toward the objective lens (element 6 of drawings 6 and 7), a deformable mirror including: a

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reflection mirror having a reflection surface on which light is reflected (409a of drawings 16 and 18 and the discussion in paragraphs [0036]-[0039]), at least part of the reflection mirror being made of a ferromagnetic member (409e of drawings 16 and 18 and the discussion in paragraphs [0036]- [0039]), the reflection mirror having a deformed state and a non-deformed state (see the discussion in paragraphs [0017] and [0036]-[0039] where current of different values are applied to the coils to achieve different deformations of the mirror); and a switching device that switches the reflection mirror between the deformed state and the non-deformed state using a magnetic force (elements 426 and 427 of drawings 16 and 18 and the discussion in paragraphs [0036]-[0039]), the switching device having a hard magnetic member made of a hard magnetic material and a magnetizing unit (elements 426 and 427 of drawings 16 and 18 and the discussion in paragraphs [0036]- [0039]), wherein the hard magnetic member has a state in which the hard magnetic member is magnetized and a state in which the hard magnetic member is demagnetized, and the magnetizing unit is switchable between the state in which the hard magnetic member is magnetized and the state in which the hard magnetic member is demagnetized (see the discussion in paragraphs [0036]-[0038] where current of different values are applied to the coils to achieve different deformations of the mirror; also note the discussion regarding permanent magnet 426) and, wherein the feeding portion supplies the optical head with the power needed to switch the states of the reflection mirror only when the reflection mirror is switched between the deformed state and the non-deformed state (see the discussion in paragraphs [0036]-[0039] where current of different values are applied to the coils to

achieve different deformations of the mirror; also note the discussion regarding permanent magnet 426).

**Regarding claim 55**, Maruyama discloses the optical recording and playback device according to claim 54, wherein: the deformable mirror uses the reflection mirror as a plane mirror when light is concentrated on a first recording layer farther from a light-incident surface of the optical recording and playback medium, and deforms the reflection mirror to be a concave mirror with the reflection surface forming a concave surface when light is concentrated on a second recording layer closer to the light-incident surface of the optical information playback medium (see the discussion in paragraphs [0017] and [0036]- [0039]).

### ***Claim Rejections - 35 USC § 103***

**5.** The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**6.** **Claims 38, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maruyama (JP 2003-067969) in view of Nishioka et al. (US PGPub Number 2006/0187563 A1).**

**Regarding claim 38**, Maruyama discloses the deformable mirror according to claim 29 as noted in the 35 U.S.C. 102(b) rejection above. Maruyama, however fails to specifically disclose while Nishioka discloses wherein: the reflection mirror includes a

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base member comprising a glass plate (Figures 4 and 5 and the corresponding discussion in paragraphs [0180], [0193], [0194] and [0202]); and the ferromagnetic member is provided to at least part of the base member (see Figure 5 and the discussion in paragraphs [0192]-[0195]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Nishioka into that of Maruyama. One of ordinary skill in the art at the time the invention was made would have been motivated to combine the teachings in order to provide a support means for the mirror body as suggested by Nishioka in paragraph [0180].

**Regarding claim 41**, the combination of Maruyama and Nishioka disclose the deformable mirror according to claim 38. Nishioka further discloses wherein: the reflection surface comprises a reflection coating provided on a surface of the base member (see the discussion in paragraph [0180]).

**Regarding claim 42**, the combination of Maruyama and Nishioka disclose the deformable mirror according to claim 41. Nishioka further discloses wherein: the reflection coating comprises a dielectric multi-layer film (see the discussion in paragraph [0180]).

### ***Allowable Subject Matter***

**7. Claims 43, 44, 46-51 and 56** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all

of the limitations of the base claim and any intervening claims. Claims 43, 44, 46-51 and 56 are allowable for the reasons indicated in the Office Action dated July 21, 2009.

### ***Conclusion***

**8. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LATANYA BIBBINS whose telephone number is (571)270-1125. The examiner can normally be reached on Monday through Friday 7:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on 571 272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LaTanya Bibbins/  
Examiner, Art Unit 2627

/Wayne Young/  
Supervisory Patent Examiner, Art Unit 2627